IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF:	:
KOZAWA ET AL.	: EXAMINER: SIN J. LEE
SERIAL NO.: 10/629,806	:
FILED: JULY 30, 2003	: GROUP ART UNIT: 1752

FOR: RESIST PATTERN THICKENING MATERIAL, PROCESS FOR FORMING RESIST PATTERN, AND PROCESS FOR MANUFACTURING SEMICONDUCTOR DEVICE

DECLARATION UNDER 37 CFR 1.132

COMMISSIONER FOR PATENTS
Alexandria, Virginia 22313-1450

SIR:

Now comes **Miwa Kozawa** who deposes and states:

1. That I received a bachelor degree in Applied Chemistry from Utsunomiya University in the year of 1992.

2. That I have been employed by Fujitsu Limited for 13 years as a researcher of Materials for LSI.

3. That isopropyl alcohol contained as a part of a solvent in a resist pattern thickening material of the present invention does not affect the thickening effect thereof.

4. That the following additional experiment was conducted under my supervision during the period of from May 2001 to January 2002.

Experiment:

Resist patterns were formed in the manner described below while varying a content of isopropyl alcohol (IPA) in a resist pattern thickening material so as to examine the relationship between the content of IPA and the thickening effects.

Formation of Resist Pattern

Hole patterns each having a diameter of 250 nm were formed of an ArF resist, AX5910 manufactured by Sumitomo Chemical Co., Ltd.

A resist pattern thickening material I was prepared with 16 parts of a polyvinyl acetal resin, KW-3 manufactured by Sekisui Chemical Co., Ltd., 1.35 parts of uril, and 98.6 part of pure water.

To the resist pattern thickening material I, there was added 0.4 parts of IPA to thereby prepare a resist pattern thickening material II.

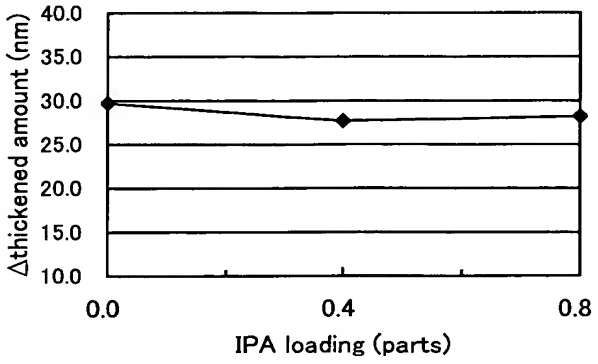
To the resist pattern thickening material I, there was added 0.8 parts of IPA to thereby prepare a resist pattern thickening material III.

The resist pattern thickening materials I-III were separately applied onto the hole patterns, by a spin coating method, first under the condition of 1000 rpm/5s, and then under the condition of 3500 rpm/40s. Thereafter, prebaking was carried out under the condition of 85°C/70s, and then crosslinking baking was carried out under the condition of 110°C/70s. Thereafter, developing was carried out on the hole patterns which had been thickened by each of the resist pattern thickening materials by rising with pure water for 60 seconds so that the uncrosslinked portions were removed. In this way, the thickened resist patterns were prepared.

Result:

The thickened amounts of the hole patterns were measured, and the relationship between the content of IPA (I: 0 part, II: 0.4 parts, III: 0.8 parts) and the thickened amount (= the initial pattern size - a size of a space pattern formed by the thickened resist pattern) was examined.

The results are shown in the following graph and table.



IPA loading (parts)	Δ thickened amount (nm)
0.0	29.7
0.4	27.7
0.8	28.2

Conclusion: .

As clearly evidenced by the data presented in the above graph and table, the content of IPA does not affect the thickening effect of the resist pattern thickening material.

5. The undersigned petitioner declares further that all statements made herein of her own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

6. Further deponent saith not.

Miwa Kozawa

Miwa Kozawa

Mar. 31, 2006

Date